ISST Forum

14 October 2004

IFPS Science Steering Team

- Brad Colman (WR) – Lead
- Mark Jackson (WR)
- Greg Mann (CR)
- Dave Sharp (SR)
- Steve Keighton (ER)
- Eric Stevens (AR)
- Bill Ward (PR)
- Pete Manousos (HPC)
- Kevin Schrab (OST) – Facilitator

Agenda

- 10-506 review (30 min)
- DGEX update (15 min)
- HPC 4-7 day position paper summary (30 min)
- Future ISST areas of interest (15 min)
- Open discussion (30 min)

ISST 10-506 Review

Recommended Revisions to Directive 10-506

The ISST

Weekly Digital Services Conference Call

4&12 October 2004

Outline

- Background and review process
- Documents distributed
- Specific changes and recommendations
  - Main body of directive
  - Appendix A – Part A
  - Appendix A – Part B
- Upcoming review process

NWSI 10-506 Overview

- NWSI 10-506 is a critical directive formally launching the NWS into the digital era
- Provides a framework for digital products and services
- Targets both internal and external audiences
- Describes basic digital data infrastructure
- Provides some “how-to” instructions
  - timeliness
  - collaboration
- Provides descriptions of non-text, digitally-based products
  - graphics
  - interactive products

Background

- 10-506 development effort started in early 2003
  - Initial recommendations came from NDFD IWT
  - Doug Young, OS22 – Team Leader
  - Team effort to build consensus
- Early timeline for Spring 2003 issuance slipped
  - Tough job!
- IOC last fall required a directive be in place
  - Some issues were tabled in order to move ahead
  - In some cases, not enough was known to make a decision
- Current version has an issuance date of 12/19/03 and an effective date of 2 January 2004
- May, 2004, LeRoy Spayd (DSPO) requested ISST review directive and make recommendations

ISST review process

- Individual and team review process
- Generally via conference calls and email
- Used external expert opinion when possible
- On a few critical issues, Region and National opinions were solicited
- First step in revisiting the directive

Review documents and plans

- An edited version of the Direction 10-506
- A companion document
  - Provides additional explanation and background material

Key factors – Overview and main body

- Dual audience complicates content
  - Remove detailed internal issues and place in memoranda, training material, and/or policy statements
- Clarified wording between NDFD and other digital products and services
- “near-seamless” is preferred over “seamless”
  - Well collaborated (within tolerances), but seamless can not be achieved
- Greater clarification of roles of national centers
- Remove ambiguity of day 1 wording

Key factors – Overview and main body

Issue: NDFD vs. LDFD in both temporal and spatial scales.

- LDFD has resolutions not captured by NDFD sampling
- NDFD spatial construction does not upscale LDFD
- NDFD weather, sky, etc., grids are values extracted from the LDFD at defined times and there is no attempt to construct temporal averages

Proposal: At this time the ISST doesn't have a specific recommendation, rather it encourages necessary discussions and forums to develop a central vision. Possible considerations include:

- Increase resolution of NDFD to 2.5 km
- Require LDFD's match NDFD resolution
- Take advantage of potential strengths in maintaining differences
  - Requires upscaling correctly from LDFD
  - Delivers local information with greater temporal and spatial resolution

Key factors – Appendix A, Part A

Issue: Grid point vs. Grid Box interpretation differences of NDFD elements must be eliminated.

- Much confusion (internal and external) on what is being presented
- Grids are not intended to represent a matrix of point forecasts
- Grid point forecasts are different in scale and character from a MOS point forecast

Proposal: We recommend a definition that explicitly equates each point to be representative of the conditions expected over the appropriate time period and across the 5 by 5 km grid box. Further, we include discussion addressing the scales of physical processes being forecast.

Key factors – Appendix A, Part A

Issue: The use of “continuous” to describe the NDFD is inconsistent with its construct.

- The NDFD presents a coarse sample of the LDFD without any effort to correctly upscale spatially or temporally.
- For example, the LDFD may have details about the timing of clouds or precipitation that are not captured in the NDFD.
- The LDFD, at its 1-h discretization, could more closely be considered “continuous.”

Proposal: We recommend using “complete” to describe the NDFD.

- This, in fact, describes well the NDFD, which can be sampled without having missing values.

Key factors – Appendix A, Part B

Issue: A mix of internal and external grids in an Appendix that, by title, is intended to describe the NDFD.

- This includes such grids as the floating PoP, which is not part of the NDFD, and is only used for internal text product generation.

Proposal: Remove them from the appendix.

- If additional internal elements are required, this information should be conveyed through internal memoranda, training materials, and policy statements from Regions and Headquarters.

Key factors – Appendix A, Part B

Issue: The PoP is presented throughout the NDFD for 12-h time periods only. Objective guidance and current capabilities offer greater time resolution than this and that should be taken advantage of within the NDFD.

Proposal: Create a PoP6 grid and maintain it for the first 72 hours of the forecast.

- This matches objective guidance.
- A correct derivation from PoP6 to PoP12 can be done to complete the PoP12 grid for the first 72 hours. So, even though a grid is being added, it doesn't require substantially more work.

Key factors – Appendix A, Part B

Issue: The directive requires precipitating weather be included for all times when the PoP is at least 15%, so weather is required for entire 12-h periods even if the forecasters know the threat is not uniform.

- This is the reason why some offices (and the existing directive) have developed floating PoP. This 15% criteria is then applied to the floating PoP grid to gain better temporal resolution for formatters, etc.

Proposal: Eliminate the floating PoP12 grid and have the weather grid be floating (and dominate) to allow fine specification (1 h discretization) of weather.

- There will be times when the PoP12 or PoP6 grid values are large, but no weather is given.
- It requires a simple logic to check the weather grid to determine if the time of concern is the time of the corresponding precipitation threat. This would be done with the formatters.

Key factors – Appendix A, Part B

Issue: QPF definitions and practice are not valid.

- The PoP is presented as a deterministic forecast…i.e., "the total amount of expected" precipitation. In that case, for PoPs less than 50% the QPF should be zero.
- Yet, the directive requires precipitating weather be included for all times when the PoP is at least 15%. This causes a large over-forecasting error for PoPs less than 50%.
- Areas with typically low PoPs wanted capability to show threat of measurable precipitation.
- During strong convection, but low PoPs, there is the need to be able to convey the threat of rather extreme amounts of precipitation.

Proposal: Correctly use the QPF6 grid as a deterministic QPF.

- In general application assign zero QPF6 for PoP less than 50%.
- Allow forecaster discretion for PoPs between 15 and 50% during high likelihood of occurrence of showers but low PoPs.

QPF (continued)

Proposal (cont): Create an additional grid, called Maximum QPF (MQPF), which represents the 90th percentile of the conditional QPF distribution.

- In other words, you are at the 90% likelihood that the observed precipitation amount will be less than or equal to the MQPF value.
- This gives an effective way to communicate a threat of heavy precipitation.
- MPQF would be non-zero for PoPs 15% and higher.
- Currently only limited guidance available, so efforts would need to be put in place to provide it.

What next?

- Circulate documents and solicit feedback
- Initial discussions today
- Planning an ISST Forum for later this month
- Engage Regions and Headquarters
- Final recommendations and feedback to DSPO and Doug Young for further action

DGEX Update

- Feedback
  - Is it being used?
  - Is it useful?

- Upcoming teletraining sessions
  - Oct 15, noon EDT (4 slots open)
  - Oct 21, 5pm EDT (full)
  - Oct 26, 4pm EDT (4 slots open)
  - Oct 27, 1pm EDT (3 slots open)
  - Oct 28, 10am EDT (6 slots open)

HPC 4-7 Day Grids

- Background information
- Summary of ISST position paper

HPC 4-7 Day Grids

- In response to ER WFO survey that determined decreased forecaster efficiency and performance
  - Especially during periods of critical short term weather
  - On average, 2-4 hrs per shift to produce 4-7 day grids
- Use HPC extended period experience, tools and data to create 5-km sensible weather grids for days 4-7

HPC 4-7 Day 5km CONUS Grids

- MaxT, MinT, 12 hr PoP*, 6 hr Td, 6 hr wind speed and direction, 6 hr cloud cover, Wx*
  - * valid for periods of MaxT and MinT
- Disseminated via web (.gif) and SBN (Grib2)

  http://www.hpc.ncep.noaa.gov/5km_grids/5km_gridsbody.html

  - Not yet displayable on AWIPS or useable in GFE
    - Scheduled for OB5 (Feb-Mar '05) and IFPS17
- Issued at 15Z

HPC's Day 4-7 Gridded Forecasts - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://www.hpc.ncep.noaa.gov/5km_grids/5km_gridsbody.html Go Links

www.nws.noaa.gov

National Weather Service
Hydrometeorological Prediction Center

Site Map | News | Organization | Search All NWS search Go

HPC's Day 4-7 Gridded Forecasts

How Are the Grids Created?

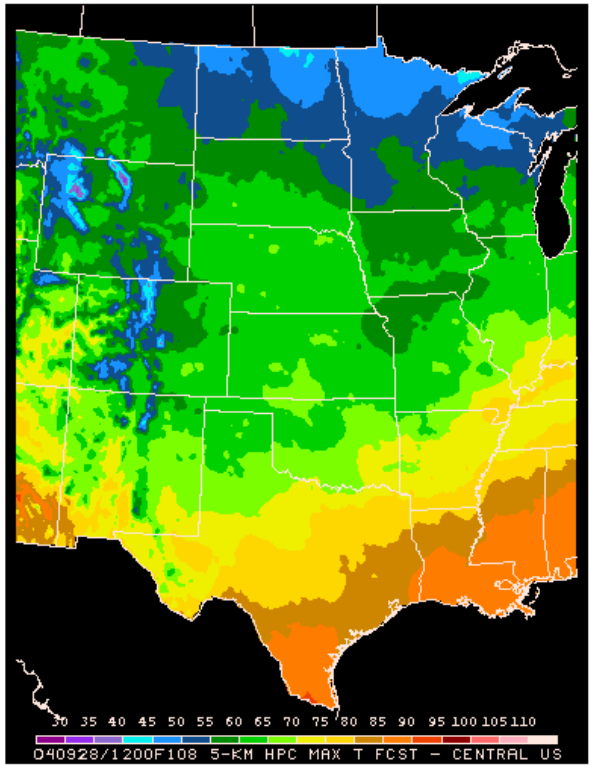
Day 4 10/2/04	<	>
Temperature	Min	Max
12-Hour Probability of Precipitation	00z - 12z	12z - 00z
Dew Point	06z 12z	18z 00z
Winds	06z 12z	18z 00z
Cloud Cover	06z 12z	18z 00z
Weather	12z	00z
Cycle Image	< Prev	> Next

- Eastern U.S.
- Central U.S.
- Western U.S.

Change Region

MouseOver Effect ON

Updated 10:55 AM EDT September 28, 2004



Done Internet

Element Generation

Details at http://www.hpc.ncep.noaa.gov/5km_grids/medr_5km_methodology.pdf

- Max/Min T
  - 5km grid obtained by imparting HPC forecast (adjustments to MOS)-PRISM differences at 380 CONUS stations to 5km PRISM background grid using Barnes OA technique
- 12h PoP
  - Similar procedure, except using GFSXMOS instead of PRISM data
- 6h Dewpoint
  - Dewpoint from GFS ensemble member closest to HPC forecast found at each 380 CONUS station – at times of both max and min T.
  - Linear time interpolation used to derive 6h point forecasts
  - Points converted to 5km grids using the same process (with PRISM data) as with Max or Min T grids
- 6h Wind (Speed and direction)
  - Geostrophic winds derived from HPC PMSL contours and interpolated to 6h grids – capped by GFSXMOS 12h max wind speed
- WX Type
  - Max/Min T used to determine ptype only when HPC 12h PoP > 30%
  - If <32 snow, >35 rain, otherwise mixed, when GFSXMOS Thunder prob >30%, convective
- Sky Cover
  - Based on HPC 12h PoP and Max T
  - GFSXMOS cloud cover used as a reference
  - Linear interpolation performed to get 6h intervals and then converted to a grid

Issues

- HPC needs to test the concept of producing grids
  - Grids are an initial effort – not final method
  - Grid content can be improved and methods will become more sophisticated…assuming concept is sound
  - Grid generation methods need to be tested in areas of complex terrain
- Feedback from WFOs desired to determine the following:
  1) The concept of getting grids from HPC doesn't work
  2) The concept is good, but HPC grids need to be better
  3) The grids can be used now
- Evaluation also desired by HPC to determine if simply transmitting the HPC forecasts at the ~380 HPC points will serve the WFOs as well as HPC grids
  - Spread through WFO grid using "MatchGuidance" procedure

Current and Near Term Efforts

- Current efforts
  - Extending grids to the offshore waters
  - Although all grids from HPC will include information for the offshore waters initial efforts are focused on
    - Max/Min T and Dewpoint
    - Strategies based on discussions with WFOs possessing marine responsibilities
      - MRY, TPA, CLE, PHI
- Near term efforts
  - Will take advantage of 5km Gridded MOS from MDL
    - Slated to come available fall 2005
  - Will offer a better starting point to HPC than MOS points
  - Will allow HPC to produce detailed wind, sky, pop, wx type fields not available now

ISST Position Paper on HPC 4-7 Day Grid Generation and Field Use

Position paper available at ISST web site at
http://www.nws.noaa.gov/ost/ifps_sst/

- HPC plays an important role in the generation of the NDFD
  - Will continue to do so during continued IFPS development
- Contribution of HPC 4-7 day grids, and impact on forecast process, is currently unknown
- Concern with scientific validity of grid generation methods
  - Concept of when, where, and how grids are used

HPC's Role in IFPS

- Current HPC contribution to NDFD days 4-7 production
  - 12Planet, phone, graphics/text products, HPC forecast points (Max, Min, PoP)
- Potential additional contribution of HPC 4-7 day grids
  - Additional populating option, especially during periods of active short-term weather
  - Valuable reference tool to communicate HPC's extended guidance and model evaluation
  - Reference point to better ensure spatial consistencies

Forecaster Workload Issues

- Forecaster efficiency and performance during active weather must be considered in system design
  - Now have improved guidance suite (DGEX, more GFS data)
  - Employ effective WFO workload management and grid production priority system
    - Concentrate on “forecast problem of the day”, whether in short- or long-term
- Must consider marginal extended period model accuracy, and need to produce forecast-to-forecast consistency
  - Avoids direct translation of model run-to-run inconsistency
  - May elect to keep current grids with little or no edits

HPC/WFO Partnership in Producing NDFD

- ISST strongly opposes any system design that bypasses local forecaster expertise in generation of NDFD grids through day 7
- Combination of knowledge, experience, data, and tools at HPC, with similar contributions at the local WFO, produces most accurate and valuable 4-7 day forecasts
  - Also ensures better temporal consistency
  - Retains local forecaster familiarity with critical extended term weather – resulting in better communication of events to local customers and partners
- WFOs should have access to HPC-MOS deltas and continued use of HPC forecast point text product

Grid Generation Issues

- Considered a reasonable first step
- HPC has limited tools to generate grids
  - N-AWIPS
- Concern with limited 4-dimensional depiction of HPC products
  - Emphasizes importance of product consistency
- Concern with method to spread HPC points throughout 5-km grid, especially in areas of complex terrain and abnormal weather regimes

Evaluation and Testing

- ISST advocates evaluation and testing period, ideally covering 60-90 days, and during time of year with active weather
- Objective verification of grids, possibly in house, using grid-based verification, or at least expanded point observation set
- Field use evaluation (when grids become available)
- Results should be used to potentially modify grid generation methodology, field use, or both.
  - May consider other options to incorporate HPC information in grids

ISST Future Areas of Interest

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- Digital Forecast Process Discussions
  - Stimulate healthy discussion toward positive growth.
  - Create synergy within the agency, especially among operations personnel.
  - Compile and share constructive commentary with strategic planners and decision-makers.
  - Currently making use of several listservers (electronic forums).
  - A series of three ‘Survey Questions’ to be incrementally posted as discussion topics.
  - Status of postings; SR/SOO Focus Groups.

Listserver Questions

- *#1 - "Within the limits of predictability, what are the optimal spatial and temporal resolutions needed to provide a useful and versatile digital service while maintaining scientific validity?"*

- *#2 - "What is the best way to minimize discrepancies and produce a near-seamless NDFD while not sacrificing accuracy or efficiency?"*

- *#3 - "How should each NCEP center support the WFOs contribution to the digital forecast process?"*

Other Areas of Interest

(listed in no particular order)

- Verification strategies for gridded forecasts.
- Analysis of Record; Analysis of the Moment.
- The disposition of gridded forecasts for high impact weather and extreme events (hurricanes, winter storms, etc.).
- Probabilistic gridded forecasts (to complement our deterministic gridded forecasts).
- Facilitating the maturation and utility of Day-1 grids; considerations for Day-2 and Day-3.

Open Discussion

- Questions/comments on other topics?